

*AMO  
CON*

vinylidene chloride/vinyl chloride copolymer, vinylidene chloride/methyl acrylate copolymer, vinylidene chloride/ethyl acrylate copolymer, and vinylidene chloride/acrylonitrile copolymer.

56. The heat shrinkable film according to Claim 2, wherein said film is a multilayer film. ---

## **REMARKS**

### **I. Status of the Claims and Above Amendments to the Claims and Specification**

With the entry of the above amendments, Claims 1-57 are pending in this application. Claims 1, 16, 18, 28, 35, 36, 42, and 43 are the pending independent claims. Claims 2-15, 17, 19-27, 29-34, and 37-41, and 44-57 are the pending dependent claims.

The majority of the above amendments to Claims 1-11, 17, 21, 26, 31, 33, and 35-39 are of a general nature, i.e., amendments of a clerical nature to improve the readability of the claims. More particularly, the amendments further clarify the antecedent basis for various claim recitations, and correct minor grammatical errors in the claims. Furthermore, several of the amendments clarify the open-ended scope of the claims and include blends of the Markush group members recited.

Each of independent Claims 1, 16, 18, 28, 35, 36 has been amended to recite the homogeneous copolymer as having a density of above 0.90 g/cc. Support for this amendment can be found at Page 9 lines 12-15 of Applicants' specification. In addition, each of independent Claims 1, 16, 18, 28, 35, and 36 has been amended to recite the homogeneous copolymer as a linear copolymer. Support for this amendment can be found in Applicants' specification at Page 13, lines 4-6.

Newly-presented independent claims 42 and 43 also recite the homogeneous copolymer as a linear copolymer, as well as reciting the homogeneous copolymer as having a density of above 0.90 g/cc. Newly-presented independent Claim 42 is directed to a seamless tubing which comprises a film which contains the homogeneous linear ethylene/alpha-olefin copolymer having a density above 0.90 g/cc. Support for the claiming of a seamless tubing can be found in Applicants' specification at, for example, Page 11 lines 7-20, which discloses the process of forming films by coextrusion to produce the film in the form of a "tube." It is well known to those of skill in the art that such film tubes are formed by the extrusion of the molten polymer through an annular die, and that the result is a seamless tubing. Accordingly, Applicants specification describes the subject matter claimed in newly-presented Claim 42.

Support for newly-presented process Claims 43, 44, and 45 can be found in Applicants' specification at, for example, Page 10 line 22 through Page 11 line 6. Support for Claims 46 and 47 can be found in Examples 11-22 (see Page 23 lines 16-18), and Examples 23-26 (see Page 23 lines 25-26). Support for Claim 48 can be found at Page 10, lines 27-29. Support for Claim 49 can be found at Page 10 line 29 through Page 11 line 2. Support for Claims 50, 51, and 52 can be found in Examples 11-18, 74-76, and 80-82 of the specification (Pages 16-33), which disclose Examples of orienting multilayer films at the following temperatures: 83°C, 87°C, 91°C, 99°C, 113°C, and 115°C. Support for Claim 53 can be found at Page 10 lines 24-27. Support for Claim 54 can be found at Page 10 lines 19-22. Support for Claim 55 can be found at Page 11 lines 7-20. Support for Claim 56 can be found at, for example, Page 21, lines 3-18.

No new matter is present in any of the amendments to the claims or in any of the newly-presented claims.

Finally, Applicants have amended Pages 21, 30, and 31 by changing "°C" to ---°F--- in several instances. Applicants note that in each instance in which this amendment is being made, the specification states that the orientation is being made "out of hot water." As a result, one of skill in the art would readily realize that the orientation temperatures provided are erroneous because hot water cannot exist at, for example, 195°C, unless it is under pressure, which clearly is not the process being described. Applicants contend that one of skill in the art would clearly realize that the °C should actually be °F, and that this amendment is not new matter.

**II. The Objection to Claims 21 and 31, and**  
**The Rejection of Claims 26, 33, and 36-41 under 35 USC 112**

In the May 13 Office Action, Claims 21 and 31 were objected to because the word "copolymer" was not recited after the phrase "ethylene vinyl alcohol." Claims 26, 33, and 36-41 are rejected under 35 USC 112, second paragraph, as indefinite. More particularly, the Examiner states that in Claims 26 and 33, it is not clear what is meant by an "abuse layer; and that the term "substantially" recited in Claim 36 is a relative word which renders the claim indefinite.

In response, Applicants note that the amendments to Claims 21 and 31 include the addition of the word "copolymer" after the phrase "ethylene vinyl alcohol." Moreover, the amendment of Claims 26 and 33 includes the deletion of the phrase "abuse layer." Moreover, Claims 36 and 38 have been amended by the deletion of the term "substantially." Accordingly, Applicants respectfully request the withdrawal of the objection to Claims 21 and 31, as well as the withdrawal of the §112 rejection of Claims 26, 33, and 36-41.

**III. The Rejection of Claims 1-3 and 8-11 under §102(e),  
as Anticipated by LAI et. al. '272 and '236**

In the 13 May Office Action, Claims 1-3 and 8-11 are rejected under 35 USC 102(e) as anticipated by U.S. Patent No. 5,278,272, to Lai et al ("LAI et al '272") and U.S. Patent No. 5,272,236 to Lai et al ("LAI et al '236"). The Office Action states that LAI et al '272 and LAI et al '236 teach ethylene/alpha-olefin polymers having long chain branching produced by single site catalysts, these polymers being used to produce blown films as well as films made using conventional processing techniques, etc. The Office Action acknowledges that LAI et al '272 and '236 are silent regarding the shrinkability of the films, but the Examiner takes the position that the films produced by blown bubbles are inherently heat shrinkable, and because Applicants admit that the blown bubble procedure is well known.

In response, Applicants again note that Claim 1, upon which rejected Claims 2-3 and 8-11 depend, has been amended to recite a heat shrinkable film containing a *linear* homogeneous copolymer. The homogeneous copolymer of LAI et al '272 is not a linear copolymer, but rather has *long chain branching*. See Column 3 lines 57-64 of LAI et al '272, as well as Column 3 line 65 through Column 4 line 10 of LAI et al '272. These portions of LAI et al '272 make it clear that the polymers of LAI et al '272 have *long chain branching*, and are not *linear* copolymers. As such, Applicants contend that Claims 1-3 and 8-11 are clearly novel over LAI et al '272 and LAI et al '236.

**IV. The Rejection of Claims 1, 2, 12-15, and 36 under §102(e),  
as Anticipated by RALPH**

In the 13 May Office Action, Claims 1, 2, 12-15, and 36 are rejected under 35 USC 102(e) as anticipated by U.S. Patent No. 5,272,016, to Ralph ("RALPH"). The Office Action states that

RALPH teaches multilayer shrink film comprising metallocene catalyzed polyolefins (VLDPE), more particularly a metallocene catalyzed ethylene/butene copolymer available from Exxon. The Office Action further states that these copolymers are mixed in various proportions with an alpha-olefin plastomer having a density below 0.90 g/cc to produce multilayer films with superior strength, abuse resistance, and heat sealability, in which EXACT polymers have densities of at least 0.900 as VLDPE.

In response, Applicants first note that the only metallocene catalyzed homogeneous ethylene alpha-olefin copolymer disclosed in RALPH is the "Exact 3010C" resin from Exxon. This resin has a stated density of 0.900 g/cc. The only other homogeneous ethylene/alpha-olefin copolymers disclosed in RALPH are the TAFMER<sup>TM</sup> polymers, all of which have a density of less than 0.90 g/cc. Note Table A in Column 6 of RALPH, which discloses three Mitsui polymers having densities of 0.88 g/cc, 0.89 g/cc, and 0.885 g/cc. Applicants have hereinabove amended each of independent Claims 1, 16, 18, 28, 35, and 36 to recite a film comprising a homogeneous ethylene/alpha-olefin copolymer having a density of *above* 0.90 g/cc. As RALPH does not disclose any homogeneous ethylene/alpha-olefin copolymer having a density above 0.90 g/cc, RALPH does not anticipate any one or more of the pending claims, and the rejection under §102(e) should be withdrawn.

#### **V. The Rejection of Claims 4-7 as Obvious over LAI et al '272**

In the 13 May Office Action, Claims 4-7 are rejected under 35 USC 103 as obvious over LAI et al '272. The Office Action states that LAI et al '272 teaches to blend various polymers with the material of their invention to produce films using conventional methods.

In response, Applicants again note that Claim 1, upon which rejected Claims 4-7 depend, has been amended to recite a heat shrinkable film. Moreover, Claim 1 has been amended to recite the homogeneous copolymer as being a *linear* copolymer. The homogeneous copolymer of LAI et al '272 is not a *linear* copolymer, but rather has *long chain branching*. Again, see Column 3 lines 57-64 of LAI et al '272, as well as Column 3 line 65 through Column 4 line 10 of LAI et al '272. These portions of LAI et al '272 make it clear that the polymers of LAI et al '272 have long chain branching, and are not linear copolymers. As such, Applicants contend that there is no *prima facie* case of obviousness over any one or more of Claims 4-7 over LAI et al '272, as amended hereinabove, and accordingly that this ground of rejection should be withdrawn.

**VI. The Rejection of Claims 1-11 as Obvious over LAI et al '272**  
**In view of Applicants' Disclosure on Page 10, Paragraph 4**

In the 13 May Office Action, Claims 1-11 are rejected under 35 USC 103 as obvious over LAI et al '272 in view of Applicants' "admission" on Page 10, Paragraph 4 of their specification. The Office Action states that LAI et al '272 teaches films containing homogeneous polymer, and that although blown films are produced, LAI et al '272 further teaches that conventional methods can be used to process their polymers, and that Applicants admit, on Page 10 of their specification, that heat shrinkable films are conventionally produced by blown bubble methods and that this type of process is well known to those of skill in the art. The Office Action concludes that it would have been obvious to one of ordinary skill in the art to use the polymers of LAI et al '272 to make heat shrinkable films using the blown bubble technique, because Applicants "admit" that blown bubble processing is well known for the production of heat shrinkable films.

In response, Applicants initially note that independent Claim 1, from which Claims 2-11 depend, is amended hereinabove to recite the homogeneous ethylene/alpha-olefin copolymer as being a *linear* copolymer. As discussed above, LAI et al '272 is directed to copolymers having long chain branching. For the reasons already pointed out above, these homogeneous copolymers having long chain branching are not linear copolymers. As such, Applicants contend that LAI et al '272 in view of Applicants' disclosure on Page 10 of their specification, does not establish a prima facie case of obviousness of any one or more of Applicants' Claims 1-11.

In order to more fully appreciate the difference between the disclosure of LAI et al '272 and Applicants' claimed films, Applicants direct attention to the fact that the Office Action does not refer to any specific teaching or suggestion in LAI et al '272 to make a heat shrinkable film in which the films is oriented in the solid state, using conventional processing techniques. In fact, there is no such teaching in LAI et al '272. Rather, Column 15 lines 64-68 of LAI et al '272 discloses:

Composition comprising the olefin polymers can also be formed into fabricated articles such as those previously mentioned using conventional polyolefin processing techniques which are well known to those skilled in the art of polyolefin processing.

As to fabricated articles, Column 15 lines 21-46 of LAI et al '272 discloses:

Fabricated articles made from the novel olefin polymers may be prepared using all of the conventional polyolefin processing techniques. Useful articles include films (e.g., cast, blown and extrusion coated), fibers (e.g., staple fibers (including use of a novel olefin polymer disclosed herein as at least one component comprising at least a portion of the fiber's surface), spunbound fibers or melt blown fibers...both woven and nonwoven fabrics...and molded articles...wire and cable coating operations, impact modification...sheet extrusion for vacuum forming operations.

As can be seen from these portions of LAI et al '272, there is broad disclosure of the utility for the polymers of LAI et al '272. Notably, Column 15 of LAI et al '272 does not appear to disclose any specific teaching or suggestion of Applicants' claimed heat shrinkable film. Although Applicants have disclosed that heat shrinkable films are conventionally made with a "blown" bubble technique, the disclosure in Column 15 of LAI et al '272 of a "blown" film would not be interpreted by one of skill in the art to be a film made by the same process used to make Applicants' claimed heat shrinkable multilayer film. Rather, those of skill in the art realize that the blown film disclosed in Column 15 of LAI et al '272 it is reference to a so-called "hot-blown" film, in which the polymer is extruded from an annular die and immediately hot blown, with the polymer chains being oriented while being above, at, or slightly below their melting point.

In stark contrast, Applicants' claimed heat shrinkable film is made by extruding a relatively thick tape, which is cooled to a solid state, thereafter reheated to its softening point, then biaxially oriented while at the softening point, and finally quenched while substantially retaining its stretched dimensions. Those of skill in the art readily recognize that the orientation temperature for the making of a heat shrinkable film is far less than the melting temperature at which orientation occurs for in the making of a hot blown film.

In the making of a blown film, air is continuously supplied through the center of the annular die, thereby inflating, i.e., "blowing", the emerging extrudate while it is at or near its melting temperature. This process is commonly referred to as a "single bubble," or a "simple bubble process," or a "hot blown film process", and also as a process for making a blown film. The phrase "blown film"

is recognized by those of skill in the art as being the film resulting from this type of melt orientation process.

In contrast, heat-shrinkable films of the invention are made by solid state orientation, i.e., orientation at the softening temperature of the polymer. When heat shrinkable films are produced from an annular die, this process is referred to as a "trapped bubble" or a "double bubble" process. This is because heat shrinkable films are solid state oriented having already undergone extrusion and cooling to the solid state, to provide the thick "tape" which is oriented by trapped bubble or double bubble. A "trapped bubble" manufacturing process involves sustaining a column of air (tube of air) between two pinch rollers. "Double bubble" refers to the same process, but with reference to making the tape being the first "bubble" with the "trapped bubble" being the second bubble, at which solid state orientation is carried out. In preparing the trapped bubble, air is once introduced into the tape while it is between the first and second pairs of nip rollers. While this filling of the trapped air column is by way of compressed air, i.e., blowing, the result is certainly not a blown film. The resulting trapped bubble of air causes the tape to be stretched (between the two nip positions) while it is in the solid state. As the tape is forwarded, it continuously undergoes biaxial orientation at its softening point, thereby producing a heat shrinkable film, i.e., a film which will shrink when reheated to (or near) its softening temperature. This is different from a blown film, which will not biaxially shrink when heated to its softening temperature.

The Office Action relies upon the following portion of Page 10 of Applicants' specification:

The heat shrinkable film of the present invention is preferably oriented and is formed by extrusion processes especially art-known coextrusion methods. It is initially cooled to a solid state by, for example, cascading water or chilled air quenching, after which it is reheated to within its orientation temperature range and oriented by

stretching. The stretching to orient may be accomplished in many ways such as, for example, by "blown bubble" techniques or "tenter framing." These processes are well known to those skilled in the art and refer to orientation procedures whereby the material is heated to its softening temperature and then stretched in the cross or transverse direction (TD) and/or in the longitudinal or machine direction (MD). After being heated and stretched, the film is quickly quenched while substantially retaining its stretched dimensions to cool the film rapidly and thus set or lock in the oriented molecular configuration.

Applicants note that the disclosure of a "blown bubble" process in the above-quoted passage was an unfortunate choice of words. This portion of the specification should have disclosed the process as a "trapped bubble" process, rather than a "blown bubble" process. Elsewhere in the specification, e.g., Page 21 lines 16-18, the correct phrase "trapped bubble" is used. Consideration of the above passage from Page 10, together with the remainder of the specification, reveals how Page 10 of the specification, when read by one of ordinary skill in the art, would clearly be interpreted as being a description of a "trapped bubble" process. More particularly, the passage discloses making a heat shrinkable film by extrusion followed by cooling to the solid state, followed by reheating the material to its softening temperature and thereafter using a bubble to stretch the film in its transverse and machine directions while the material is at its softening temperature, followed by quenching the film to lock-in the molecular orientation. As described above, the orientation at the softening temperature is different from a blown film process, and produces a different type of film. Again, blown film processes are understood as producing orientation above, at, or slightly below, the melting point of the polymers undergoing extrusion, i.e., melt oriented. Such is not the case for a heat shrinkable film, which is made by orientation at a much lower temperature, i.e., solid state oriented. Those of skill in the art would

readily understand Page 10 as describing a process for making a film in which the polymer is oriented in the solid state, in stark contrast to a blown film.

In summary, the disclosure of blown film in LAI et al '272 is concerned with melt orientation, in contrast to the solid state orientation disclosed throughout Applicants' specification. The teaching of a blown film in LAI et al '272, in contrast to Applicants' teaching of a film made using a "trapped bubble", even when incorrectly disclosed as a "blown bubble" in the passage on Page 10 of Applicants' specification, would not lead one of skill in the art to use the polymer of LAI et al '272 to make Applicants' claimed heat shrinkable film. Applicants specification, when considered as a whole, simply does not pertain to blown films. As a result, it is clear that the subject matter of Applicants' pending claims is patentable over LAI et al '272 in view of Applicants' specification.

The §103 Rejection of Claims 1, 2, 6, 8-11, and 15-17 as Obvious over  
MUELLER et al in view of LAI et al '236

In the 13 May Office Action, Claims 1, 2, 6, 8-11, and 15-17 are rejected under 35 USC 103, as obvious over U.S. Patent No. 4,532,189 to Mueller et al ("MUELLER et al") in view of LAI et al '236. The Examiner states that MUELLER et al teaches heat shrinkable multi-layer films comprising DOWLEX 2045 (i.e., "LLDPE") in a core layer of a film having improved optical properties, and that LAI et al '236 teaches substantially linear polyethylene that has properties superior to conventional polyethylenes, in terms of gloss, haze, and clarity, and that LAI et al '236 further teaches that resins of their invention would be useful in films and useful in blends. The Examiner concluded that it would have been obvious to one having ordinary skill in the art at the time the invention was made to use substantially linear olefin polymers of the type taught by LAI et al '236 in place of LLDPE in the films

taught by MUELLER et al, in order to produce a film having higher gloss, lower haze, and better clarity which could be more easily produced.

In response, Applicants initially note that each of their independent Claims 1 and 16 have been amended to recite the homogeneous copolymer as a *linear* copolymer, in contrast to the *long chain branched* copolymer of LAI et al '272. As argued above in response to the various previous rejections relying on LAI et al '272, Applicants are claiming a heat shrinkable film containing a linear homogeneous copolymer which is different from the long chain branched homogeneous copolymer of LAI et al '272. Moreover, MUELLER et al does not disclose Applicants' recited homogeneous linear copolymer either. As a result, the MUELLER et al in view of LAI et al '272 does not rise to the level of generating a *prima facie* case of obviousness over any one or more of Applicants' amended independent Claims 1, 16, 18, 28, 35, and 36. Moreover, each of newly-presented independent claims, i.e., Claims 42 and 43, also recite a homogeneous linear copolymer. As such, all pending claims recite a polymer which is not disclosed in either MUELLER et al or LAI et al '272, and on this basis Applicants respectfully submit that this ground of rejection should be withdrawn.

The §103 Rejection of Claims 1, 2, 3, 5, 6, 8-13, and 36 as Obvious over SCHOENBERG in view of SCHUT and VAN der SANDEN et al

In the 13 May Office Action, Claims 1, 2, 3, 5, 6, 8-13, and 36 are rejected under 35 USC 103, as obvious over U.S. Patent No. 4,551,380 to Schoenberg ("SCHOENBERG"), in view of Schut "Enter a New Generation of Polyolefins" November 1991, Plastics Technology (hereinafter "SCHUT") and Van der Sanden et al "EXACT Linear Polymers of Enhanced Sealing Performance" ANTEC 1992 (hereinafter "VAN der SANDEN et al"). The Office Acton states that SCHOENBERG teaches heat

sealable shrinkable three layers laminated films with LLDPE core layers and surface layers of a blend of LLDPE, LMDPE, and EVA. The Office Action acknowledges that SCHOENBERG does not teach the use of polyolefins produced using single site metallocene catalysts. The Office Action goes on to state that SCHUT teaches that Exxon is producing a new line of linear low density polyolefins using metallocene catalysts, and that these polymers have superior physical properties (lower heat seal initiation temperature, higher impact strength, and better clarity; and that VAN der SANDEN et al further elaborates on these metallocene catalyzed copolymers as being a choice material for the production of heat sealable films. This Office Action concludes with the statement that it would have been obvious to use the homogeneous copolymers of SCHUT and VAN der SANDEN et al in the laminate structure of SCHOENBERG to produce puncture resistant films with improved sealability and strength.

In response, Applicants contend that Claims 1, 2, 3, 5, 6, 8-13, and 36 are patentable over SCHOENBERG in view of SCHUT and VAN der SANDEN et al. Each of these rejected claims, as amended herein, is directed to a heat shrinkable film that will return to its unstretched dimensions when heated. In contrast, the films disclosed by SCHUT and VAN der SANDEN et al are not heat shrinkable films; they are not films which have been extruded and cooled to its solid state, and thereafter heated to the softening temperature of the polymer and then stretched in the machine and transverse directions followed by being quenched, so that the film will return to its unstretched dimensions when heated. More particularly, the only type of film referred to in SCHUT is a "cast film." See the last column of SCHUT for the statement regarding cast films. Those of skill in the art recognize this phrase as referring to a film which is not heat shrinkable. Moreover, this same portion of

SCHUT discloses the new resins as exhibiting "low melt strength," which those of skill in the art would recognize as presenting a problem in the typical downward cast process for making a heat shrinkable film. Thus, there is no teaching or suggestion in SCHUT that would lead those of skill in the art to believe that the homogeneous Exxon copolymers disclosed therein are suitable for the making of a heat shrinkable film. Rather, taking SCHUT as a whole, one of ordinary skill may not be motivated to combine and may well consider the polymer described in SCHUT would not be useful for making a heat shrinkable film, due to the nature of the typical commercial production process for making heat shrinkable films, as explained above in response to the §103 rejection based on LAI et al '272 in view of Applicants' specification.

Turning next to VAN der SANDEN et al, Applicants note that this document also fails to make any teaching regarding heat shrinkable films. Rather, the only actual films disclosed in VAN der SANDEN et al are the 50 micron *blown* films disclosed in the paragraph spanning the bottom of the first column of Page 155 and the top of the second column of this same page. These films are disclosed as being *blown* monolayer films which were back taped with polyester tape.

As explained above in response to the §103 rejection based on LAI '272 in view of Applicants' specification, there are significant technical distinctions between blown films and heat shrinkable films. Applicants' claims, as amended hereinabove, are clearly directed to heat shrinkable films. Applicants' films have different characteristics from blown films because they are produced by a process which is fundamentally different from the process used to make all blown films. That is, Applicants' claimed heat shrinkable films are produced by orientation while the polymer is in the solid state, i.e., at the softening temperature of the polymer. In contrast, blown films are oriented while the polymer is

molten. Thus, Applicants claimed films are fundamentally different from the films described in both SCHUT and VAN der SANDEN et al. Those of skill in the art recognize this fundamental difference, and as a result would not be led to use the new Exxon polymer in the commercial type processes for making heat shrinkable films described in SCHOENBERG. In fact, those of skill in the art, upon reading in SCHUT that the new Exxon polymers lack adequate melt strength for the making of monolayer blown films, would be more likely to be led away from trying the new Exxon polymers for the making of heat shrinkable films, than to be led to try to make a heat shrinkable film with the Exxon polymer which is acknowledged as having low melt strength.

The fact that both SCHUT and VAN der SANDEN et al refer to various advantages from the new Exxon polymer (e.g., seal initiation, impact, improved optical properties, etc.) could be motivation to use the Exxon polymers in blown and cast films. However, it is certainly not motivation to use the Exxon polymers in heat shrinkable films. The properties obtained with the Exxon resin in the blown and cast films of SCHUT and VAN der SANDEN et al are not properties which will necessarily also be obtained in heat shrinkable films. That is, there is chemical unpredictability as to whether the properties a given polymer exhibits in blown films will also be obtained in heat shrinkable films. Again, at most it is merely obvious to try the Exxon resin in the making of a heat shrinkable film and to try with knowledge of the risk of inadequate melt strength. However, considering SCHUT and VAN der SANDEN et al as a whole, clearly the teaching in SCHUT of low melt strength would lead the skilled artisan away from the use of these resins in heat shrinkable films. In summary, the significant differences between cast and blown films versus heat shrinkable films are differences which defeat the

conclusion that even a *prima facie* case of obviousness is present in SCHOENBERG in view of SCHUT and VAN der SANDEN et al.

In addition to the above arguments, Applicants note that they have obtained unexpected results *in heat shrinkable films* using their recited homogeneous linear ethylene/alpha-olefin copolymer. More particularly, Applicants direct attention to Page 22 lines 19-27 of their specification, which is as follows:

The oriented multilayer films of Examples 11-22 were tested for free shrink and instrumented impact with the results given below in Table IV. It may be seen that when comparing the metallocene resin films of Examples 11 and 15 or 12 and 16 with the comparative example counterparts of 19 and 20, a substantial improvement in impact resistance is seen. Similarly, a comparison of Examples 13 and 17 or 14 and 18 with their respective comparative heterogeneous Examples 21 and 22 show an improved impact for the metallocene resins.

More particularly, the results in Table IV (Page 23, lines 1-16) show that the multilayer, *heat-shrinkable* films of Examples 11 and 15 have a peak impact strengths of 86.8 pounds and 77.4 pounds, respectively, while the *heat shrinkable* films of corresponding comparative Examples 19 and 20 have peak impact strengths of only 54.2 pounds and 55.1 pounds. Comparing the average of the impact of Examples 11 and 15 (83.0 pounds) against the average of the impact strengths of comparative Examples 19 and 21 (54.65 pounds), one can see a 58% increase in impact strength. Similar results hold for a comparison of Examples 12 and 16 when compared against comparative Examples 19 and 20 (44.6% increase). It should be noted that this is a comparison of multilayer films all of which were: (a) exposed to the same level of irradiation (2MR), (b) all of which were oriented by trapped bubble method out of hot water at 195°F, and (c) all of which were 5 layer films with 4 identical layers and a

fifth layer which contained an ethylene/alpha-olefin having a density of 0.902 g/cc (Examples 11), 0.905 g/cc (Examples 15, 19, and 21). Thus, the only significant difference in the films was the type of polymer, i.e., homogeneous versus heterogeneous. The multilayer *heat shrinkable* films containing the linear homogeneous copolymers exhibited an average impact strength more than 50% higher than the heat shrinkable films containing virtually identical heterogeneous copolymers. Applicants contend that this is evidence of unexpected result. Moreover, it was in their application as filed, and was not produced after the PTO rejected Applicants claims.

In addition, a review of Table I on Page 19 of Applicants' specification demonstrates that Applicants' claimed films can exhibit significantly greater free shrink at 200°F (Examples 1, 2, 3, and 4), as well as significantly higher instrumented impact strength (Examples 1, 2, 3, and 4), than heat shrinkable films containing conventional heterogeneous LLDPE (Example 5). All these films had the same thickness (1 mil) and were oriented the same amount (3.5 x 3.5). The films of the invention exhibited an average shrink about 860% of the shrink of the LLDPE control film of Example 5, while also exhibiting an average impact strength about 855% of the LLDPE control film of Example 5. This evidence indicates that Applicants claimed films can exhibit a combination of shrink and impact strength which is unexpectedly superior to the results obtained with heterogeneous copolymers. Moreover, the fact that these films are monolayer films establishes that it is the homogeneous copolymer in a heat shrinkable film which is producing these results.

VAN der SANDEN et al makes no mention of heat shrinkable films, not to mention impact resistant heat shrinkable films of Applicants' invention. VAN der SANDEN et al has no teaching or suggestion that the new Exxon polymers can provide heat shrinkable films with impact strength more

than 50 percent greater than was obtained using corresponding heterogeneous copolymers. The disclosure of improved impact strength in SCHUT is accompanied by a description including "coextruded cast films", "3-mil film", and "monolayer blown film grades." None of these films is a heat shrinkable film. Applicants discovery of increased impact strength in a *heat shrinkable* film is clearly unexpected in view of SCHUT and VAN der SANDEN et al.

Applicants contend that until their invention, there was a substantial element of chemical unpredictability in whether a linear homogeneous ethylene/alpha-olefin copolymer could have been oriented in the typical downward casting commercial processes used to make heat shrinkable films. Some polymers have enough wall strength for conversion to heat shrinkable films by a downward casting process, while others have not had the requisite wall strength. Applicants have discovered that Exxon's metallocene catalyzed linear ethylene/alpha-olefin copolymers inherently lack adequate melt strength to undergo the downward casting process used in the commercial production of heat-shrinkable films. However, in order to obtain a heat shrinkable film using the downward cast commercial process for making heat shrinkable films, the low melt strength of the linear homogeneous ethylene/alpha-olefin copolymer must be supplemented by other polymers in the film. Hence, some of Applicants claims are directed to multilayer films, and films in which the linear homogeneous polymer is blended with another polymer, so that the additional polymer can provide additional melt strength so that a downwardly cast tape can be extruded, cooled, reheated to its softening temperature, oriented, and quenched.<sup>1</sup>

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<sup>1</sup> As a side note, Applicants have discovered a solution to the low melt strength problem for using the linear Exxon homogeneous copolymer to make a heat shrinkable film, i.e., Applicants have discovered that the linear Exxon homogeneous copolymer can be oriented on a T.M Long stretcher (which is a form of tenter frame).

The §103 Rejection of Claims 1, 2, 12, 13, and 18-41as Obvious over  
EVERT et al in view of SCHUT and VAN der SANDEN et al

And

The §103 Rejection of Claims 1, 2, 12-15, 18-22, 23-27, 28-31, and 33-41as Obvious over  
NEWSOME et al in view of SCHUT and VAN der SANDEN et al

In the 13 May Office Action, Claims 1, 2, 12, 13, and 18-41 were rejected as obvious over U.S. Patent No. 5,055,328, to Evert et al ("EVERT et al"), in view of SCHUT and VAN der SANDEN et al, and Claims 1, 2, 12-15, 18-22, 23-27, 28-31, and 33-41 were rejected as obvious over U.S. Patent NO. 4,457,960, to Newsome et al ("NEWSOME et al") in view of SCHUT and VAN der SANDEN et al. Both of these grounds of rejection relied upon SCHUT and VAN der SANDEN et al in the same manner as described above, and in addition, relied on the primary documents for their disclosure of various multilayer heat shrinkable film structures. The Office Action acknowledges that neither EVERT et al nor NEWSOME et al disclose metallocene catalyzed LLDPE.

In response, Applicants contend that the rejected claims are patentable over EVERT et al in view of SCHUT and VAN der SANDEN et al, as well as patentable over NEWSOME et al in view of SCHUT and VAN der SANDEN et al. Applicants acknowledge that both EVERT et al and NEWSOME et al disclose multilayer heat shrinkable film. Based upon the same arguments advanced above in response to the rejection based on SCHOENBERG in view of SCHUT and VAN der SANDEN et al, Applicants contend that it would not have been obvious to one of ordinary skill in the art to substitute the metallocene catalyzed Exxon copolymers in the cast or blown films of SCHUT and VAN der SANDEN et al for the copolymers in the heat shrinkable films of EVERT et al or the NEWSOME et al. More particularly, Applicants contend that there is no teaching or suggestion in

either SCHUT or VAN der SANDEN et al to use the Exxon resins disclosed therein to make Applicants recited *heat shrinkable* film. The cast and blown films disclosed in SCHUT and VAN der SANDEN et al have properties which are distinctly different from Applicants' films, which are made by cooling the extrudate and thereafter reheating the extrudate to the softening point of the polymers therein, and orienting the extrudate to form the film while the polymers are at their softening point. The films of SCHUT and VAN der SANDEN et al also will not return to its unstretched dimensions when heated to the softening point of the polymers therein. SCHUT's teaching of the low melt strength of the Exxon polymers may even lead those of ordinary skill in the art not to use the Exxon resin in typical commercial processes for making heat shrinkable films.

PREVIOUSLY FILED INFORMATION DISCLOSURE STATEMENT

Applicants note that the 13 May Office Action contained an initialed copy of the Form PTO-1449 filed by Applicants on 20 February 1998. Items 75 and 76 of the IDS were not initialed, but rather were struck through by the Examiner. Applicants respectfully request that these items be considered and made of record, and Applicants provide herewith a copy of "Appendix A" which contains a statement pertaining to the meaning of Items 75 and 76 of the IDS of 20 February 1998. Applicants also provide herewith a copy of another PTO-1449 together with another copy of each of Items 75 and 76 as filed 20 February 1998. As these items were filed before the first Office Action, no fee is believed to be necessary for the consideration of these documents at this time.

REQUEST FOR CORRECTED FILING RECEIPT

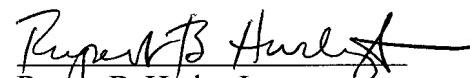
The present application is a continuation of USSN 08/747,241, filed 12 October 1996, which, in turn, is a continuation of USSN 08/418,926, filed April 7, 1995, now abandoned, which , in turn, is a continuation of USSN 07/976,122, filed November 13, 1992, now abandoned. Applicants respectfully request that the PTO send them a corrected filing receipt indicating the chain of priority for the instant application.

CONCLUSION

In view of all of the foregoing arguments, it is respectfully submitted that Claims 1-11 and 13-54 are patentable over the prior art, and in condition for allowance. Withdrawal of the various rejections set forth in the 13 May 1999 Office Action is respectfully requested.

Should there be any questions or otherwise needs to discuss any matters related to this application, the Examiner is invited to contact the undersigned at the telephone number provided below.

Respectfully Submitted,

  
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(864) 433-3247

November 11, 1999